Puget Sound Partnership – Setting Targets for Dashboard Indicators

Indicator: Eelgrass

Authors: Pete Dowty, Helen Berry, Jeff Gaeckle, DNR Aquatic Resources Division
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1. What is the current and historical condition of eelgrass in Puget Sound?

The available information suggests that there have been significant eelgrass losses relative to historical conditions and losses are continuing today. This is based on the global pattern of seagrass decline, the extensive alteration of the Puget Sound nearshore (overwater structures, dredging & filling), and the evidence of decline in the contemporary monitoring record. The overall magnitude of change since historical conditions has not been quantified.

2. What is considered a good condition for Puget Sound eelgrass as a whole?

Two broad options were considered for defining good condition for eelgrass: stable or increasing total eelgrass area. Given the likelihood of past eelgrass declines, an increasing trend is needed for Puget Sound restoration. A stable trend would protect from future losses but would not address past declines. Question 6 further discusses more specific point targets for consideration as targets for performance management.

3. Hypothesized impacts of low and high population and climate change scenarios on eelgrass

In the long-term, climate change is anticipated to lead to greater stress on eelgrass followed by decline. In some specific cases, there are likely to be initial benefits from climate change and declines may not be observed for more than 100 years, although it is not known how extensive these cases will be. Hardened shorelines will be particularly problematic for eelgrass as sea-level rises. Population growth is likely to increase stressors on eelgrass, but there is a greater potential for mitigation of these effects than for those of climate change.

4. Initial conceptual model: What affects this ecosystem component

There are many documented stressors that affect eelgrass. They fall into two broad categories: (1) Stressors that affect basic physiological requirements of eelgrass (e.g., light, temperature, oxygen, nutrients, sediment); (2) Activities in the nearshore that create direct physical stress to the plants (e.g., dredging, filling, propeller wash, boat wakes, in-water construction). Eelgrass provides key ecosystem services to a wide range of species.

5. Based on scientific understanding, how much eelgrass is needed for a functioning, resilient ecosystem?

We suggest three broad alternatives for consideration as provisional point targets for total eelgrass area for performance management:

- 20% increase over 10 years - This target reflects the average percentage increase seen in other estuaries in the United States that have established aggressive restoration programs. It is the preferred alternative because it most fully considers the Partnership's restoration goals, restoration results in other regions, and gaps in scientific knowledge in Puget Sound.
- Stable – This target strives to protect current habitat against future stressors, which are likely to increase. However, it is inconsistent with the Partnership's mandate to recover Puget Sound in the face of past declines.
- 100% or greater increase. This scale of increase would be needed for eelgrass area to equal published sources to historical levels. However, these published sources are based on flawed

information, and therefore a 20% increase over 10 years is the strongest alternative (see also question 2).

6. Restoration potential/opportunity, including geographic/spatial information; or other projections

Restoration of eelgrass in Puget Sound, primarily conducted as compensatory mitigation, has proven to be challenging. Successful projects have demonstrated that there is potential for restoration and habitat creation. Restoration of nearshore processes may also lead indirectly to eelgrass restoration, for example, as anticipated with the Elwha River dam removal.

7. Considerations related to policy

a. Aspects of geographic distribution that might affect policy setting

The sub-basins within greater Puget Sound are ecologically distinct in terms of eelgrass bed characteristics, the functions they provide, and the combination of stressors that are likely to be most important. Initially, only a single soundwide eelgrass target will be ready for consideration. Given these unique considerations, indicator setting and tracking would be most effectively applied at the sub-basin scale.

b. Timeframes and sequencing related to anticipated results

To reach the goals, it will be important to pursue both protection of existing beds and restoration of impacted areas. Protection of existing beds and the habitat conditions is critical to preventing further losses, and can be achieved through first fully enforcing existing regulations and second addressing gaps in protections. Timeframes and sequencing related to restoration actions depend on the nature of the opportunity. Short term opportunities (for rapid restoration success) are limited primarily to areas where eelgrass propagules are needed to establish beds or habitat conditions can be improved rapidly (such as removal of structures that block light). Projects that improve habitat conditions through water quality improvement or nearshore process restoration generally require long time frames, both for project implementation and subsequent bed establishment. Stakeholder motivation and interest will have the greatest influence on development and implementation of eelgrass restoration over specified timeframes.

c. Conceptual model part 2: information on strategies and actions (and implementers) expected to have the most direct and timely effect on changing the conditions/achieving the targets

Given the diversity of eelgrass stressors in Puget Sound, the preferred approach is to pursue multiple strategies concurrently. Strategies are needed that explicitly address both protection and restoration. Examples of specific management actions that will contribute to achieving the target include enforcement of Hydraulic Project Code provisions that protect eelgrass, adding specific eelgrass protective measures to DNR leases through implementation of an Aquatic Lands Habitat Conservation Plan, and strengthening eelgrass protection in local Shoreline Master Plans. Supporting technical work should include habitat suitability modeling in concert with transplanting, and synthesizing available information on success of management actions from Puget Sound and other regions.

d. Scientific review: How has/can information be reviewed/vetted?

Much of the information reported here was drawn from a science report DNR prepared to support the target-setting process for eelgrass (Dowty et al. 2010). This report passed through an anonymous peer review process that was refereed by the chair of the Partnership's Science Panel, Tim Quinn. DNR provided a list of potential reviewers for that report and the same list could be considered for review of summaries provided in this document.